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FROM THE DEPARTMENT OF PLASTIC SURGERY B, GENTOFTE HOSPITAL, UNIVERSITY OF COPENHAGEN, COPENHAGEN, DENMARK.

BREAST RECONSTRUCTION AFTER MASTECTOMY

C. KRAG

Abstract

In Denmark mastectomized women have shown an increasing interest in breast reconstruction. Secondary reconstruction one year after completed oncologic treatment is recommended. Patients are selected in collaboration with the oncologic treatment centers mainly from the group with localized (stage I) disease. Reconstruction of the breast dome is most commonly accomplished by submuscular implantation of a soft silicone prosthesis, often preceded by tissue expansion or combined with transfer of a musculocutaneous flap. In some cases flap transfer may provide sufficient bulk to eliminate the need for a prosthesis. Reconstruction of the nipple-areola complex is performed some months later, when symmetry in breast volume and placement has been established. Altogether the reconstructions may take 1/2–1 year in uncomplicated cases depending on the method used. The cosmetic results achieved are sufficiently good to warrant a recommendation that reconstructive surgery should be available—according to need—as an integral part of the treatment of women with breast cancer.

Key words: Breast cancer, mastectomy, breast reconstruction.

In the past women having had a mastectomy have been obliged to use an exoprosthesis to hide the deformity. For most women a mastectomy creates a severe psycho-social strain and may also result in physical problems, especially if the remaining breast is large. Frustrations related to the use of an exoprosthesis in daily life are many and affects the choice of clothing often with limitations regarding summer- and sports dresses.

During the past 10 years an increasing interest in reconstructive surgery has been noted among women having had a mastectomy. Consequently the repertoire of the plastic surgeon has expanded to fit the individual needs of different categories of patients (2–4).

This article describes the methods most commonly used in Denmark at present.

Methods

Reconstruction of a breast dome after mastectomy may be accomplished using a soft silicone implant and/or by transferring autologous tissues to the breast region. The reconstructed breast dome therefore never aquires the qualities of a breast due to the lack of glandular tissue and natural sensibility. In rare cases, when a radical mastectomy has been performed, when skin closure has been achieved using a split-thickness skin graft, the reconstruction of a breast dome may require import of tissues either by means of transposed regional musculocutaneous flaps or by means of microsurgical composite tissue transplantation.

Schematically reconstruction of the breast dome can be accomplished in the following ways:

1) Implantation of a soft silicone prosthesis.

2) Tissue expansion followed by implantation of a soft silicone prosthesis.

3) Transfer of a flap and implantation of a soft silicone prosthesis.

4) Transfer of a bulky flap obviating the need for a prosthesis.

Having had a successful reconstruction of the breast dome many women wish to have an imitation of the nipple-areola complex surgically created. This final part of the so-called 'breast'-reconstruction is undertaken several months after the reconstruction of the breast dome and is often combined with a contralateral mammaplasty (reduction of size and/or ptosis) to achieve symmetry (Fig. 1).

Implantation of a soft silicone prosthesis. Women having had a simple mastectomy may benefit from a submuscular prosthetic

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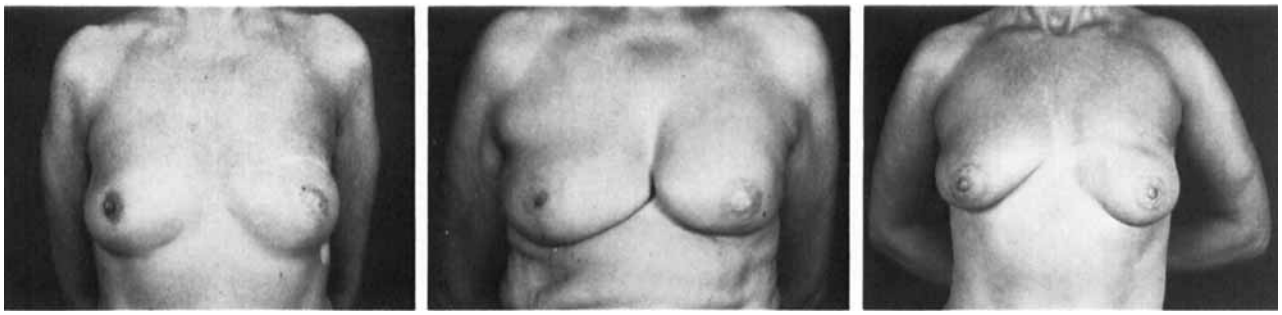

Fig. 1. Reconstruction of left breast. a) With simple prosthesis. Result one year after submuscular implantation of soft silicone prosthesis (200 cc) and 6 months after reconstruction of the nipple-areola complex. The contralateral breast has not been operated. b) After tissue expansion (max. vol. 700 cc). Result 1 1/2 year after implantation of soft silicone prosthesis (350 cc) and 1 year after reconstruction of the nipple-areola complex. The contralateral breast has been reduced in size. c) With autologous tissue. Result one year after transfer of TRAM-flap based on the right-sided superior epigastric vessels and one month after reconstruction of the nipple-areola complex. The contralateral breast has not been operated.

implant if the soft tissue cover is adequate for the prosthesis to be contained loosely. Ideally the mastectomy scar should not be contracted, the soft tissues should be relatively unaffected by possible previous radiotherapy and the pectoralis major muscle should preferably be intact as the silicone prosthesis is placed in a submuscular pocket so as to leave the mastectomy site undisturbed and at the same time obtain a soft tissue cover as thick as possible. Often, however, the reconstructed breast dome is rather flat, which may strengthen the indication for a mammaplasty on the contralateral side.

Tissue expansion followed by prosthetic implant. During the past few years it has been possible to overcome some of the above mentioned difficulties by means of artificial tissue expansion prior to the implantation of a silicone prosthesis (1, 2, 28, 33). Tissue expansion is undertaken by means of a saline filled silicone bag connected to a small self-sealing receptable via a silicone tube. This aggregate called a tissue expander may be implanted in a submuscular pocket mainly under the pectoralis major muscle and the anterior part of the serratus muscle with the receptable placed subcutaneously in the midaxillary line. Repeated percutaneous injections of moderate volumes of isotonic saline through the receptable into the bag over several weeks may allow for gradual expansion of the overlying tissues. Filling up to volumes of 700–1 000 cc may be necessary and the maximal expansion needed is kept for 3–4 months before the tissue expander is exchanged for a permanent silicone prosthesis. This method of reconstruction creates better results regarding symmetry and ptosis even with medium sized contralateral breast (17).

Flap transfer combined with prosthetic implant. In cases when a radical mastectomy has been performed, when closure of the mastectomy defect has been undertaken either with undue tension or with split-thickness skin grafts, when the mastectomy scar is contracted and the surrounding tissues are tight or when radiation damage is obvious, a flap transfer either local, regional or distant is needed for the reconstruction of a breast dome.

Transposition of local tissues as relatively thin fasciocutaneous flaps from the abdomen (18, 24, 35) or the lateral thoracic wall (20) may be sufficient to provide the needed extra soft tissue cover for a prosthetic implant.

However, musculocutaneous flaps have gained popularity due to their inherent safe viability. One of the 'work-horses' in breast reconstruction has been the latissimus dorsi musculocutaneous flap (LD-flap) (3, 5). This flap is supplied by the thoracodorsal vessels which usually are preserved in partial (diagnostic) axillary dissections. The flap is usually inserted into the recipient-site through a subcutaneous or submuscular tunnel from the axilla to the anterior chest-wall. Usually the recipient-site is created with its caudal limit corresponding to a line symmetrical with the contralateral inframammary sulcus by incision through skin and musculature and submuscular dissection in cranial direction. This gives better cosmetic results than opening the mastectomy scar. The donor site is closed by direct suture producing either a horizontal or a vertical scar which, however, has a tendency to broaden.

One of the draw-backs of the LD-flap is the necessary positioning of the patient in a lateral recumbent position which makes intraoperative comparison with the opposite breast impossible and prohibits simultaneous mammaplasty without change in positioning.

On the other hand using the transverse rectus abdominis musculocutaneous flap (TRAM-flap) (7, 19, 23, 29) has the advantage of a straightforward surgical access to both sides of the thorax and a relatively concealed donor site. This flap is supplied by the superior epigastric vessels. The transverse skin-paddle may be located either in the thoracoepigastric region contralateral to the reconstructed side or in the hypogastric region and is carried by part of the rectus abdominis muscle. Especially the lower TRAM-flap has gained popularity because the donor site is expendable (Robin-Hood effect) and has a not unpleasant side-effect of procuring the patient with an abdomino-plasty. However, use of the TRAM-flap requires a repair of the rectus fascia when the flap includes the anterior rectus fascia caudally to the *linea arcuata*.

Flap transfer without prosthetic implant. Both musculocutaneous flaps may be used combined with prosthetic implants. However, some patients do not wish to have implants due to their reputation for creating symptomatic capsules (6, 8, 14, 37) and in such cases the LD-flap, and especially the lower TRAM-flap, may be harvested in such a manner so as to provide enough bulk to create a breast dome of well over medium size (19, 26, 29, 32).

Microsurgical composite tissue transplantation from donor sites in the groin, lower abdomen, gluteal region or contralateral thoracodorsal region is rarely indicated (15, 16, 30). In cases when donor sites for conventional pedicled flaps cannot be used and the mastectomy site is unsuitable for prosthetic implantation the reconstructive problem may possibly be solved using microsurgical tissue transplantation.

However, the method chosen for reconstruction of a breast dome after mastectomy must be individualized. Local conditions at the mastectomy site, the size and degree of ptosis of the opposite breast and the patient's acceptance or not of unsightly scarring in visible donor areas all influence the choice which also depends on the experience of the surgeon.

Nipple-areola complex. Reconstruction of the nipple-areola complex is undertaken at a later date, when the scar in the reconstructed breast dome has matured and the breast dome is positioned according to the patient's wish. Correction of a misplaced nipple-areola is difficult and produces additional scarring (5, 14, 23, 34). Therefore an interval of 3–5 months is recommended before the nipple-areola reconstruction is undertaken. The areola is reconstructed using a full-thickness skin graft, either from the genito-femoral region (to get a graft of suitable pigmentation) or from the opposite areola when a mammaplasty is undertaken at the same time. The nipple projection is constructed either from local tissues or by means of a composite graft from the opposite nipple.

Demand, capacity and strategy

In Denmark the incidence of breast cancer in females is 83 : 100 000 which amounts to 2 500 new cases per year (10). About 50% of the women present with a localized tumor (stage I) while the disease is disseminated locoregionally or systemically in another 50%. The disease occurs more frequently with old age with 50% of the women being more than 60 years. This means that approximately 600 women per year would be candidates for breast reconstruction. During the past 10 years the treatment of breast cancer has been standardized by the Danish Breast Cancer Cooperative Group (DBCG) (11). The primary treatment has been: simple mastectomy combined with a diagnostic partial axillary lymphonodectomy, while a small group of women have had a tumorectomy combined with postoperative radiotherapy of the diseased breast.

During this period an increasing number of patients per year have been referred to secondary breast reconstruction (~20 to ~100). Although these numbers are small they reflect in part an increasing awareness of women of the possibility of breast reconstruction and in part the insufficient capacity of the public plastic and reconstructive surgery service, which during the same period on the whole has been reduced.

Primary reconstruction has been undertaken only in a few cases when indicated for special reasons (16, 21, 27, 36). Secondary reconstruction, with selection of younger patients, mainly in disease stage I, in collaboration with the oncologic treatment centers, has been the general rule. This mode is recommended for the following reasons: Treatment of breast cancer primarily aims at cure. Therefore possible interference with the primary treatment by reconstructive manoeuvres at the time of mastectomy is best avoided as both the disease stage and the consequent possible postoperative antineoplastic chemo- and/or radiotherapy, which may affect the result of a reconstruction, are unknown. Furthermore the planning of postoperative radiotherapy as well as postoperative physical examination later on may be rendered more difficult than necessary after primary reconstruction. Although the recurrence rates at 18 months and 5 years postoperatively, in patients with no spread to the axillary lymph nodes, are 4% and 23% respectively, the corresponding figures for patients with axillary node involvement may be as high as 48% and 78% respectively (12, 13) and only up to 30% of the recurrences present as locoregional metastases (22). Therefore it is recommended that breast reconstruction should be undertaken at least no sooner than one year after the conclusion of the primary oncologic treatment. This regimen concurs with some aspects of patient psychology: In primary breast reconstruction a 'normal' breast afflicted with a malignant lump is exchanged for a reconstructed breast dome which has a number of flaws compared to the normal breast. In secondary breast reconstruction the comparison is made to the preoperative condition of being a mastectomized, mutilated woman possibly with a compromised female identity. Although the quality of the reconstruction in both instances may surgically be the same the woman may experience a negative change after the primary reconstruction, but almost certainly a positive change after the secondary reconstruction. Furthermore, a secondary breast reconstruction leaves time for the patient to consider her situation and seek advice. Then some women will realize the need for reconstruction, knowing that the result of reconstructive surgery will be—not a recreated breast—but an imitation with flaws (9). In this context it is important that the patient is well-informed regarding the reconstructive plan, the possible draw-backs and complications so that only highly motivated women embark on the project which may call for a collaborative effort over 6–12 months in uncomplicated cases (3, 14, 31). The optimal result is a reconstructed breast of a size, shape, placement, texture and color which matches the opposite breast as much as possible. In many cases this may be achieved only after a mammaplasty on the contralateral breast. This may render clinical examination of that breast more easy, due to reduction in size, but more difficult due to scarring. Breast reduction *per se* seems to reduce the risk of developing breast cancer in the long view (25).

Conclusion

At present a reconstruction of the female breast after mastectomy may be successfully undertaken by plastic surgeons with experience to match the individual reconstructive needs of patients treated for cancer of the breast. The results achieved indicate that reconstructive surgery should be available to this group of patients according to need, as an integral part of their overall treatment, rather than being limited by insufficient hospital capacity.

Request for reprints: Dr C. Krag, Dept. of Plastic Surgery B, Gentofte Hospital, Post. 73, University of Copenhagen, Niels Andersenvej 65, DK-2900 Hellerup, Denmark.

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